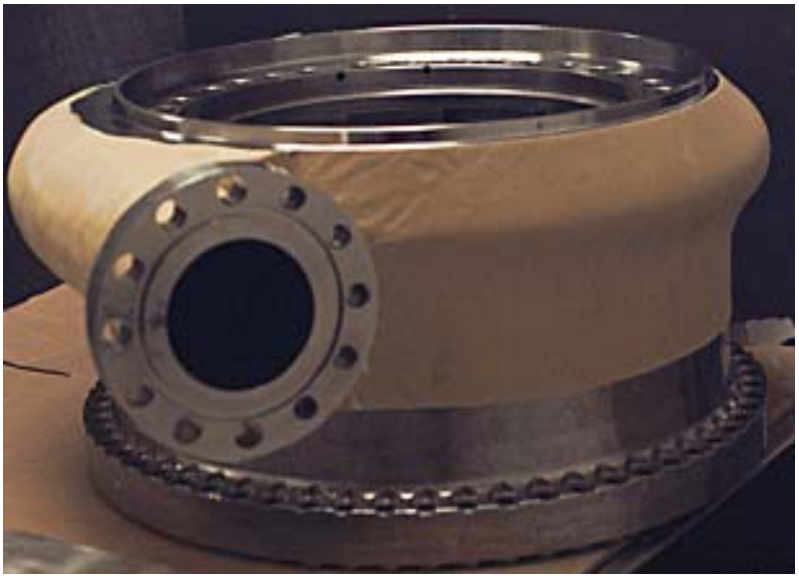
SHEAROGRAPHY FACILITY

Purpose:

To detect defects beneath insulation, paint, and laminated composites in the space flight industry.

Shearography (Shearing Holography) is an inspection technique that uses heat, vacuum or another form of agitation to identify inconsistencies in a part. The shearography camera detects minute changes of shape of a part due to heating, vacuum, or vibration. This technique can be used to find debonds in coatings, insulation, or laminated materials. This technique has been used on the Alternate High Pressure Fuel Turbopump (insulation inspection) and Pegasus Fairings.



In an electronic shearography system, a laser is passed through a beam expander which changes the laser beam into a cone of light that strikes the test specimen. The laser speckle pattern is then imaged through a telephoto lens and gathered in a Michelson interferometer to provide information on the changing shape of the specimen. The system records two images: (1) the reference image and (2) the sheared image. These images will interfere with one another, resulting in a recorded image of a laser speckle pattern indicative of the test specimen's surface slope. The system can also detect surface imperfections by recording the slope of the surface. If a defect exists below the surface, it will eventually distort the surface profile due to heating, vacuum, or vibration and be recorded by the shearography camera.

Electronic shearography has proven to be an effective means of inspecting a variety of materials for defects in multiple environments. Since implementing this system, MSFC's engineering staff can quickly adapt and integrate new inspection technologies. The system provides greater sensitivity, repeatable and uniform testing, and the ability to detect defects near inner surfaces of a closed-body structure such as fuel tanks. MSFC also uses electronic shearography to ensure product conformance and flight safety. This facility is located in Building 4711.

Point-of-Contact:

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